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vard University \$1,000 for the library and all his prehistoric and archeological objects, and his books and pamphlets relating to such subjects. To the Boston Society of Natural History is given his fossils, minerals and other objects of natural history. To Harvard College is given, for its classical department, Mr. Haynes's Etruscan, Greek and Roman vases and his ancient coins and medals. The Boston Museum of Fine Arts is to receive his Egyptian antiquities, except those relating to the age of stone in Egypt, which go to the Peabody Museum.

THE dedication of the New York State Education Building will take place on October 15-17. It is expected that educational officers of other states will attend the exercises and that the leading institutions—including libraries and museums as well as universities, colleges and schools—of this and other countries will be represented by delegates.

THE entrance requirement to the College of Medicine of the University of Cincinnati will be advanced to include two premedical years in science, after June 1, 1913.

ANNOUNCEMENT is made that at the University of Pittsburgh instruction in geology, paleontology and physiography will hereafter be given under the direction of the college instead of the School of Mines faculty, courses being offered in the department of geology by the following-named professors and instructors: Drs. C. R. Eastman (chairman), A. E. Ortmann, O. E. Jennings and Messrs. H. N. Eaton and Earl Douglass.

PROFESSOR H. R. SMITH, in charge of the animal husbandry work in the University of Nebraska, and Professor F. H. Stoneburn, professor of poultry husbandry in the Connecticut Agricultural College, have been called to the University of Minnesota.

MR. C. W. HOWARD, of Cornell, known in connection with grasshopper work in South Africa and at present with the Rockefeller Institute, has been appointed to an instructorship in the division of entomology, University of Minnesota. Mr. O. G. Babcock, of College

Park, Maryland, has been appointed as assistant to the entomological division in charge of the insectary. These two appointees take the places of Mr. C. S. Spooner and Mr. H. B. Scammell, respectively. The former goes to Georgia, accepting an offer from the state entomologist there, and the latter has been elected county inspector of nurseries and orchards in Colorado.

DR. B. W. VAN RIPER, of Nebraska Wesleyan University, has been elected assistant professor of philosophy in Boston University.

AT Smith College Elizabeth Kemper Adams has been promoted from associate professor of philosophy and education to professor of education; Aida Agnes Heine, from instructor to associate professor of geology, and Helen Ashurst Choate, from assistant to instructor in botany.

DISCUSSION AND CORRESPONDENCE

THE PRIBILOF FUR SEAL HERD

IN SCIENCE of February 2, 1912, Mr. McLean, of the Campfire Club's Committee on Game Protection, says, among other things about the diminishing fur seal herd, that "the best remedy is to let it absolutely alone."

Nature's methods are wasteful,

So careful of the type she seems,
So careless of the single life.

Civilized countries practise artificial fertilization of fish eggs, and rearing of the fry in hatcheries, because a greater proportion of eggs can be fertilized, and vastly more young brought to maturity, than by nature's methods. The domestication and control of useful animals is universally practised for similar reasons.

That the fur seal tribe would slowly increase if "let absolutely alone" may be true. So would most other beings we are at such pains to cultivate. Pelagic sealing is responsible for the present abnormal condition of the seal herd. The state department's bill for the ratification of the treaty for the suppression of such sealing, *gives the female seals the first chance they have had for twenty-five years*. The fact that we have forty thousand breeding females on the

islands to-day is attributable to our consistently practised rule of keeping down the hordes of dangerous males on land, while pelagic sealers were destroying the female stock.

The Bureau of Fisheries should not be hampered in carrying out its arrangements for a more rapid increase of the herd than nature unaided can effect.

Great Britain, Japan and Russia are to profit by the cessation of pelagic sealing, and ill-advised amendments would render the treaty ineffective, which would be deplorable. A naturalist and a member of the fur-seal investigation commission of 1896-97 for Great Britain, now writes me that

There is no doubt that fighting bulls have caused incalculable injury to the seal rookeries, and judicious killing of the males should be carried on from the date that there is known to be more than a sufficient supply for breeding purposes. There is no doubt that with proper management an increasing number of the surplus males may be killed every year with great advantage to the rookeries.

This is talk from a man who worked with us for several seasons on the Pribilofs.

Are the dozen or more naturalists who have devoted many seasons to studying the fur seal on the Pribilofs, and have long worked for the cessation of pelagic sealing, to be deprived in the end, of the opportunity to put into practise what they believe to be a rational system of fur-seal farming. If congress should be persuaded to let sentimentalists dictate the policy to be pursued on the national seal farm, it would mean a *very slow rehabilitation of the seal herd*. We can not afford to ignore what has been learned about the fur seal by the patient investigations of the past twenty years, and take a step backward.

Last November I had some correspondence with a member of the house of representatives who was taking the agitation of the Campfire Club against the killing of surplus male seals very seriously. I quote the following from a letter I wrote to him at that time:

In order to prevent annual loss of new-born young we must prevent the flooding of the breed-

ing grounds by big *males*. The logical way to do this is to market a large proportion of the three-year-olds, as we always have done, and thus prevent them from growing up into valueless but dangerous and destructive supernumeraries.

I take exception to the line in your letter "unless the herd is further depleted by the Bureau of Fisheries." The *herd* is not to be "depleted," as the females are already saved for fifteen years by the cessation of pelagic sealing, but the polygamous *male part of the herd* must be depleted (to quote your word again) if you propose to mature all your annual crop of infant seals. Nature will do the *depleting* if you don't, and *half the loss will be female pups*.

Surplus bull seals are of no more use than surplus rams or roosters. By saving them you will lose, in fifteen years, not less than \$15,000,000 of revenue.

The present revenue from the islands is over \$400,000 a year, which in fifteen years would amount to \$6,000,000, *without any increase of females*. But the females will increase, and the loss of revenue will exceed \$15,000,000 in fifteen years closed season, and you will lose an important percentage of pups besides.

This is not the first time I have endeavored to prevent well-meaning congressmen from being deceived by the misrepresentations which have been poured upon them for many years. The mischief-maker referred to has bobbed up every other year for the past eighteen years and has been discredited every time. I hope you will look up his record as just published in H. R. Doc. 93, 62d Congress, 1st Session, pp. 1153-62.

The member of the house to whom I sent this letter has at last presented an amendment to the State Department bill in which he proposes to limit the killing of male seals to 5,000 a year for five years, 7,500 a year for the following five years and 10,000 annually for five years after that. At the end of fifteen years new regulations to be adopted.

Now that is better. The gentleman has evidently been thinking it over. We shouldn't probably kill much closer if allowed to have our own way. Perhaps by the time the treaty bill reaches the senate, congress will decide that the Bureau of Fisheries is able to handle the seal fishery safely for the seal herd and for the government.

As to the criticism of my general statement about the *Uncinaria* parasite, I can only reply that our diminished rookeries are *not at present overspreading into the parasite-infected sand areas*. In fact, Mr. Heath states, as quoted by Mr. McLean, "these areas have been abandoned." They must of course be fenced to protect the younger seals from infection as soon as the breeding grounds begin to expand. As to shooting some of the big males when they get too numerous, it would puzzle the experts, as well as Mr. McLean, to say which were the fittest to survive. They all look alike. Old Ocean attends to the matter of selection in the case of the fur seal, weaklings do not survive the seven-month's migration swim among the killer whales of the Pacific. If Mr. McLean will bring his committee to my office where there is a fairly complete set of rookery photographs and charts, he will get a clearer understanding of the Pribilof breeding grounds than he has at present. The fact is that the innocent Camp Fire Club is being used by the unscrupulous lobby which has always been kept at work by the pelagic sealers. One excuse suits it as well as another, this time it is the killing of surplus males. It is a pity that year after year it should succeed in getting the support of men of good standing who happen to be ignorant of the real facts involved.

C. H. TOWNSEND,
Member Advisory Board
Fur Seal Service

TO THE EDITOR OF SCIENCE: In SCIENCE for February 2, Mr. Marshall McLean, member of the Camp Fire Club, enters the list of those who would by indirection ruin the fur seal herd. He would have "natural conditions" rule upon the fur seal islands and "all killing of selected males for commercial purposes . . . cease until the tide of increase in the fur seal herd has once more set toward the flood." He lays down as reason for this the principle "that when any species of wild animal has become so depleted as to be in danger of extinction, the best remedy is to let it absolutely alone."

Singularly enough he quotes President David Starr Jordan in support of his position. The quotation, however, is from an essay on the effects of war, the selection of the most fit for military service and their destruction in war tending to reverse the process of natural selection under which the fittest should survive. The assumption of Mr. McLean is that the killing of fur seals, as practised on the islands, is a selection out of the best, leaving an inferior quality of males to breed. President Jordan would not admit this and is in fact utterly opposed to any scheme for the suspension of land killing as at present conducted.

To do President Jordan justice in the fur seal matter quotation should be made from his reports on this subject which followed the investigations made in 1896-97 under his direction. On page 147 of Vol. 1 of the final report of the Commission, speaking of a *modus vivendi* similar to the one which Mr. McLean would institute, which prevailed in 1891-93, he says:

The suspension of killing on land only released young males to grow up which are now, as idle and superfluous bulls, a menace to the rookeries.

Again, on page 120 of the same volume,

Moreover, the removal of this superfluous male life is not only possible, but it is really beneficial to the herd. The only deaths among the adult bulls and cows, discovered upon the rookeries of the islands, resulted from the struggling of the bulls among themselves or to attain possession of the cows.

In the investigation of 1896-97 a number of eminent scientists from the Smithsonian Institution were associated with President Jordan and a commission of British scientists made a concurrent investigation. These men came together as a joint Conference of Fur Seal Experts in Washington at the close of the investigation and agreed upon a statement of facts regarding the fur seals. The full text of the finding of fact of this Conference will be found on pages 240-244 of Vol. 1 of the final report of the American Commission.

Mr. McLean should read this document. In Article 9 occurs this statement:

The methods of driving and killing practised on the islands, as they have come under our observation during the past two years, call for no criticism or objection. An adequate supply of bulls is present on the rookeries; the number of older bachelors rejected in the drives during the period in question is such as to safeguard in the immediate future a similarly adequate supply; the breeding bulls, females and pups on the breeding rookeries are not disturbed; there is no evidence or sign of impairment, by driving, of the vitality of males; the operations of driving and killing are conducted skillfully and without inhumanity.

In Article 13 it is further stated:

The polygamous habit of the animal, coupled with an equal birthrate of the two sexes, permits a large number of males to be removed with impunity from the herd, while, as with other animals, any similar abstraction of females checks or lessens the herd's increase, or when carried further, brings about an actual diminution of the herd.

Passing to the side of pelagic sealing the Conference of Experts has this to say:

Article 11. Pelagic sealing involves the killing of males and females alike, without discrimination and in proportion as the two sexes coexist in the sea. . . . In 1895 Mr. A. B. Alexander, on behalf of the government of the United States, found 62.3 per cent. of females in the catch of the *Dora Seward* in Bering Sea, and in 1896 Mr. Andrew Halkett, on behalf of the Canadian government, found 84.2 per cent. in the catch of the same schooner in the same sea.

These quotations from the findings of fact of the experts are more guarded than would have been the same statements made by the American Commission alone, but they state with sufficient clearness the effect of land killing and pelagic killing in their relation to the herd. They offer little support to the contention of Mr. McLean.

At the same time President Jordan would recognize that the law of the survival of the fittest applies to the fur seals. The seat of the operation of this law is, however, at sea and not on the land. The fur seals spend the winter in the open ocean. They get all their

food at sea. The difficulty of obtaining food and the buffetings of the severe northern winter constitute the sifting process by which the weak and ineffective fur seal, male or female, is ruthlessly weeded out, leaving only those that are absolutely fit to return to the islands in the spring. The killing gang does not select out the best. They are all alike good. It selects its animals by ages, an animal of three years giving a larger and hence more valuable skin.

But the question at issue is not a theoretical one. For the past fifteen years pelagic sealing has been the recognized sole cause of the decline of the fur seal herd. On July 7 last the United States secured the agreement of Great Britain, Russia and Japan to a treaty for the abolition of this form of sealing. This treaty obligates the United States to pay to Canada and Japan fifteen per cent. each of its land catch, these nations buying off their pelagic sealers. It is only necessary to put this treaty in effect by act of Congress, the Sulzer bill now before the House having this end in view. But opposition to the bill arises. It takes the form of an amendment providing for a "zapooseka" or close season of fifteen years, coincident with the term of the treaty, in which there shall be no land sealing. That is, the government is to have no land catch to share with the cooperating nations. They will become dissatisfied, withdraw from the treaty, and pelagic sealing will be resumed. Such is the inevitable trend of this misguided effort to which the Camp Fire Club is wittingly or unwittingly lending itself.

The principle laid down by Mr. McLean may apply to pairing animals like the deer, bear, duck or quail. But the fur seal is a polygamous animal and has nothing in common with these wild creatures. Its true analogies are with the domestic animals—cattle, horses, sheep, poultry—which man handles for his comfort or profit and from which he regularly removes the superfluous males without damage to the breeding stock. Would Mr. McLean have us believe that the way to recuperate a herd of cattle that had fallen into decline

through the illicit killing of its cows and calves was to leave it absolutely alone? A cattle man would stop the killing of the females and young, would look out for a reserve of bulls, and market his steers as usual. Especially would he do this if it were necessary for him to pay for the cooperation of his neighbors in suppressing the illicit killing.

Mr. McLean would have us take a different course. He would have the government begin by depriving itself of an immediate income of about \$400,000. The herd has probably yielded this amount in the lowest year of its existence. This income has possibilities of indefinite increase with the recovering herd. But there would be no increase. With no quota to share with the cooperating nations the treaty would lapse. Pelagic sealing would be resumed. The herd would continue on its way to extinction. Is this what Mr. McLean and the Camp Fire Club want?

GEORGE ARCHIBALD CLARK

STANFORD UNIVERSITY, CALIF.,

February 7, 1912

ANOTHER VIEW OF THE PRINCIPLES OF WATER-POWER DEVELOPMENT

IN SCIENCE of December 15 the foremost place is given to Dr. W J McGee's statement of the above-mentioned principles. As the subject is one of general scientific interest, I beg leave to present it from a different point of view.

A couple of centuries of legislation, following decade by decade the settlement of the country and the appropriation and use of its waters for power, irrigation, etc., have left little scope for the application of Dr. McGee's principles, at least on the part of the federal government. He writes as if he were laying out plans for a continent not yet occupied by human beings. It may as well be recognized that in the older part of the United States the more desirable water powers have all passed completely into private ownership. The practical application of his principles, if there be any, must then be in the newer, and chiefly the western, part of the United States. But

even here irrigation waters are already appropriated very generally except in those not rare cases where a large capital is required for the first installation. Water-power can not be dissociated from the subject of irrigation in the west, because the same water often serves both purposes, and may even be taken away from one to serve the other. It is surprising to see all through the west that every spot where irrigation can be cheaply applied to good soil has been farmed with the aid of water for many years. Many cases have come under my observation, from forty to a hundred miles from a railroad, where irrigation has been practised for thirty or forty years, generally up to the limit of the water supply or of the good land. It is very late in the day to talk about the general principles which should govern the framing of laws on irrigation, but it is astounding to read (McGee's principles 34 and 36) that legislation at present should be tentative and experimental. Every western state has voluminous laws on the subject, and ten times more voluminous legal decisions on those laws. The general principle has had full acceptance for a long time that the states have complete authority over the use of waters within their respective borders except for the purpose of navigation and in a few unusual cases. While there is a "borderland" here that is not worked out, there is no reason to suppose that the general control of its own irrigation waters by the state will be materially impaired.

This control necessarily extends to the public lands within the state. In nearly every case where the settler puts in a small irrigation system for his own use, his head-gate and the most of his ditch are on government land, since he has to go some distance above his own land to get the fall requisite. A later homesteader above him can not disturb his ditches, even though occupying a tract across which they run. This policy runs back almost beyond history, and is as well settled as anything can be.

Turning now to the subject of water-power, we find that all the western states have pro-